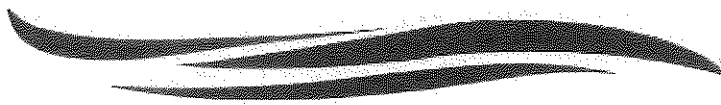


HWU



Henderson Water Utility

WATER • WASTEWATER • STORMWATER

*CAPITAL IMPROVEMENT PROGRAM
AND STRATEGIC PLAN*

WATER – WASTEWATER – STORMWATER

HENDERSON WATER UTILITY

HENDERSON, KENTUCKY

Updated 17 April 2019

HENDERSON WATER UTILITY CAPITAL IMPROVEMENT PROGRAM AND STRATEGIC PLAN

WATER – WASTEWATER – STORMWATER



I. GOALS AND PURPOSE OF THIS PLAN

This represents the fifth annual update of a Capital Improvement and Strategic Plan first adopted in June 2014. Our objective with this document has been to develop a cost effective and environmentally sound Capital Improvement Program for the water, wastewater, and stormwater systems in the City of Henderson to accommodate existing needs and projected growth to the year 2029. The rolling 10-year-plus time frame was chosen to give longer-term guidance to our efforts, with the realization that planning beyond 2 to 5 years is of marginal value, as conditions change over time. We update this plan annually, prior to the budgeting process, to lay out a logical sequence of work that fits the resources available.

To arrive at the Capital Improvement Program, we continuously evaluate existing Henderson Water Utility (HWU) water and wastewater treatment, distribution and collection facilities, along with our stormwater assets, to assess their physical condition, capacity, and improvement needs, and use these assessments to schedule capital projects within budgetary constraints. Much of this evaluation is reactive, rather than predictive; accurate information on condition of all our assets is unavailable, so we identify problems as they arise and rank projects accordingly.

The principal short-term goal for Implementation of this plan in the beginning was to finish the final Long-Term Control Plan (LTCP) project, the North WWTP Headworks. Now that project is complete, and we have negotiated termination of the Consent Judgment and moved on with our obligations for post-construction monitoring and meeting the requirements of our soon-to-be-issued discharge permit for the North wastewater system.

After completing the LTCP, our primary current projects have been major renovation of our water storage facilities and water treatment plants, where needed expenditures for maintenance and upgrades were delayed by work on the LTCP projects. To date, three of our nine water storage tanks have been painted and rehabilitated, with a fourth tank project in the planning stage.

This plan lays the groundwork for increasing our capacity to serve growth areas, together with an attempt to maintain the systems and facilities we currently have, balancing risk with the money we have available.

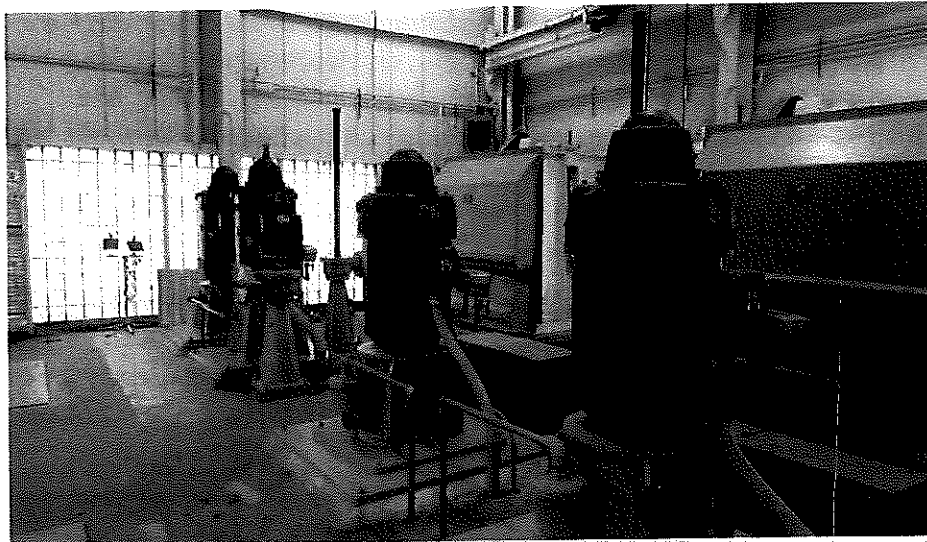
New to the document last year, we describe the critical elements of our business practices for the operation of the Utility (the *Strategic* part of the plan, in Section VII), and discuss the significant risks we face, in the financial, environmental, safety and personnel realms.

II. WATER SYSTEM PROJECTS

A. North Water Treatment Plant

- i. Raw Water Intake: With the completion of a Raw Water Intake renovation project in 2013, the supply side of the NWTP is in excellent condition. We installed pumps with a capacity of up to 20.0 million gallons per day (mgd), with the two largest pumps running, and a 30" raw water supply line running from the intake toward plant. This project included acquisition of and provision for connection of temporary pumps, in case of a failure of the intake structure or pumps.

This capacity for raw water is sufficient for present needs, and for anticipated capacity for the term to 2030. We have seen no significant increase in water demand since the upgrade was completed, and in fact, residential use continues to decline, year over year. Most of our residential use is concentrated in the North service area.



New Pumps and Travelling Screens @ Raw Water Intake

- ii. Capacity: The nominal rated capacity of the NWTP treatment system is 12.0 mgd, based on filter flow rate, with one of the six filters off-line. For the period from January 2009 to date, production at the plant has not exceeded 10.8 mgd; that occurred in 2012, and the peak has declined in most years since then. During the higher usage months of June, July and August, peak usage may reach the 8 to 10 mgd range for 1 to 3 days at a time. Average daily demand during the period from 2009 to 2018 was 6.22 mgd, and this number has also shown a decline, from an average of 6.5 mgd from 2009 to 2012, to an average of 6 mgd from 2013 thru 2018. Average production thus equates to about 50 % of plant capacity. If a large industrial customer locates in the North service area, an increase in filter capacity may be necessary, but for the ten-year study period, it appears that capacity of the NWTP is sufficient, as it does not approach 80% of capacity on a sustained basis.

- iii. **Critical Repairs (Phase 1 Project):** In 2013, we completed a study of needed repairs at the North Water Treatment Plant in coordination with Clark Deltz, Inc. (CDI). The study looked at critical and non-critical elements of the plant buildings, basins and appurtenances, and included a complete structural evaluation of the basins due to concerns with ongoing underground leakage along the Water Street frontage of the plant.

Construction of the critical elements from the study was included in a "Phase 1" project that started in November 2015 and was completed in September 2016. The structurally unsound condition of the flash mix basin was the main issue addressed in the Phase 1 project, with the solution being construction of a new flash mixing basin and drop box within the abandoned settled water aeration area at the front of the plant, near Water Street. By constructing a new wall along the west end of the superpulsator clarifiers and a new effluent line from the superpulsator clarifiers to the contact basin, a significant volume of "dead" water was eliminated, reducing chlorine use. Also, water leakage beneath the riprap slope on the west side of the plant was greatly reduced.



While constructing these improvements we replaced the influent screen, added a bypass for the contact basin, replaced deteriorated baffles and installed algae control covers. The project also included increasing the size of the influent piping across Water Street. Construction was phased to account for the high-demand summer period.

- iv. **North Water Treatment Plant - Non-Critical Repairs (Phase 2 Project):** Improvements scheduled in Phase 2 of the CDI study include replacing pump check valves, improvements to the clear well, roof repairs, upgraded HVAC systems and facility aesthetics. Since the area currently used to store water treatment chemicals does not have the ventilation and cooling systems required to meet recommended standards, the main plant building's HVAC system will be upgraded. Project includes upgrades to filter metering. Phase 2 also includes most of the structural and architectural building repair; however, short term repair of the brick façade was recommended and included within Phase 1 to ensure a safe working environment for staff. Phase 2 projects may be accomplished in several smaller projects, spreading the expense out to the extent possible. Phase 2 will also include upgrades to the high service building, to make it fit better into the improved look of the Riverwalk and riverfront park areas.

All these NWTP improvements are shown on Sheet 2 of the Appendix, where the non-critical items are pushed out to 2025.

- v. **Long-Range Planning for North WTP:** In the longer term (15 to 25 years), it's possible that regulations and improved technology will lead us to install membrane filtration for the North Water System. Given our investment in the Raw Water Intake and the origin of the distribution system around the NWTP location, it is unlikely that a new membrane filtration plant could be sited remotely from the present locale without significant additional expense to pipe a raw water supply to another location, and then pipe finished water back to Water Street where the

larger distribution system piping originates. Due to the reduced footprint a membrane filter plant would occupy, it is possible that a new building could be located behind the present clearwell location, adjacent to Red Banks Park. Sedimentation basins could be constructed just south of the high service building, between it and the now-vacant Station One power plant site. This conceptual plan also allows continued use of the distribution system origin and the high service/clearwell facilities.

Taking this approach to a new North WTP might also allow the current plant site on the east side of Water Street to be redeveloped. This long-range planning should be considered in any plans for the Station One site.

A study was conducted in 2000 & 2002 to determine the feasibility of using wells as a raw water source. Results of those studies showed that in the immediate area of the City, there is little capacity for adequate wells, due to shallow bedrock. Areas further afield (Horseshoe Bend and the Geneva bottoms) showed more promise, but their relative distance from the center of town make them impractical. There may be areas near the City's new Borax Drive industrial development where wells could be of use for industrial cooling or washing needs, and HWU is prepared to assist in developing those resources if beneficial use can be had, especially as relates to the City's new industrial park on Borax Drive.

We have also investigated a mixed-oxidants (MiOx) system, which may provide a different method of disinfection for the North potable water system. MiOx is touted to reduce disinfection by-products (DBPs) and the biofilm that naturally grows on the interior of distribution system piping. More study is needed before moving forward with this, as the system would cost over \$ 1.0 million, including equipment, brine storage and a building to house it. We have not included a project for this system in the current plan.

B. South Water Treatment Plant

A study of projects to mitigate risk at the South Water Treatment Plant (SWTP) was completed in 2014. Designs for several projects from that study are complete, and projects are being phased as funds become available. J.R. Wauford is the design engineer.

- i. **Plant Capacity:** Expansion of the SWTP to increase capacity and replace the existing plant was the main part of this study. A new plant with membrane filtration could be built in stages, spreading out the financial impact, and we authorized Wauford to take this through the design stage including permitting, so that we can be ready to build the upgrade on short notice, if prompted by plant failure or capacity needed for a new industry. Since the choice of membrane technology from any of several bidders impacts other aspects of the design, we issued an RFP for the membrane equipment, and that process included setting up a pilot plant at the SWTP to confirm that the membrane system proposed will work. That's as far as the membrane procurement has gone, unless and until we make a decision to renovate/expand the plant. Membrane acquisition contract was awarded to Zenon Technologies, a division of General Electric, and expenditures for this pilot study were \$ 125,000.

Costs for the new membrane filtration plant were estimated in late 2014 at \$ 8.1 million for a 4.0 mgd option, or \$ 10 million for an ultimate 6.0 mgd facility. No funds are included in this plan, for this expansion, which we now believe will cost \$ 12 million.

- ii. **Short-Term Repairs:** Our “wait and see” strategy on plant replacement/upgrade has required repairs to the existing plant to keep it in service until we can afford to build the expansion, and to ensure that the existing plant life is extended until that expansion is complete. A project to expedite these repairs was completed in spring 2016, at a cost of approximately \$ 185,000.

We are also investigating the possibility of dredging or expanding the lake at the plant, to provide a larger reservoir of raw water that can be treated as a buffer, should the Big Rivers intake be out of service. A survey to quantify our options is complete.

- iii. **Clearwell Improvements:** An inspection in late 2013 revealed internal corrosion of the 800,000-gallon ground-mounted steel tank used for storage of filtered water. There are also areas on the inlet piping that are rusted through, and we’re unable to completely repair those areas since the tank cannot be dewatered while the plant is in operation. We bid a project to paint this tank, but the bids came in at nearly 70% of the cost of a new tank, so a present worth analysis was performed that shows that a new prestressed concrete tank (re-using the current tank cover) is the most economical option. Plans are complete and approval has been received from KDOW, but construction awaits availability of funds; currently scheduled for 2019, but only if costs are offset by a grant.
- iv. **Filter Backwash System:** We have enlisted J.R. Wauford to investigate the possibility of installing a filter backwash pumping system to increase the efficiency of the plant. Currently, filter backwash is accomplished by a gravity feed from the in-service filters, resulting in long backwash cycles and inefficient use of filtered water. A backwash pumping system will reduce the length of time and the clean water used in this process, making more water available daily for sale and use. Estimated at \$ 450,000, this project will be folded into plans for the Clearwell replacement outlined above.
- v. **Raw Water Supply:** Our study included options related to raw water pumping (which relies on cooling water pumps at the Big Rivers power plant) and includes an option of installing our own raw water pumps in the Big Rivers intake (at \$ 1.6 million), or possible improvements to the raw water feed lines, adding provision for emergency bypass connections. This study also includes consideration of future capacity expansion. Currently, the SWTP runs near 80% of its rated capacity of 4.0 mgd for 5 days a week. There is thus insufficient extra capacity to serve potential industrial users at the nearby 4-Star industrial park. Planning for a capacity boost is included in sizing calculations for the raw water pipeline. The raw water line (with the sister wastewater effluent line) is estimated to cost \$ 1.2 million and is shown in the plan to be constructed in 2020.

C. **Water Distribution Systems**

- i. **South Distribution:** At the South WTP, the distribution system is relatively new, and there are no known deficiencies that require upgrades. Most of our South distribution lines are “transmission” mains, as our primary customers are contractual (Sebree, Beech Grove, and the Tyson facilities). Additional industrial customers in the 4-Star Industrial Park will require relatively short water line extensions, depending on usage.

One possible project that was included in the South WTP planning report is a parallel transmission main from the plant to the 4-Star tank, which will allow the high service pumps to

be used to maintain two pressure zones, one for Tyson and 4-Star, and one for Sebree and Beech Grove. This would facilitate plant and tank operations, removing the need to operate several valves each day to switch flow from the Tyson tank to Sebree. This project has an estimated cost of \$ 585,000 and is shown in an out year of the plan (2027), as a low priority.

The long main in the South water system that extends to Beech Grove and the Tyson Hatchery in McLean County does not have a sufficient number of hydrants installed to adequately flush the line. We will be adding a small project to correct this deficiency.

- ii. North Distribution: The North distribution system serving the City is divided into three pressure zones: North/Frontier (from about 14th Street north, and east of the Cloverleaf on US 60), South/College (from Fairmont Cemetery, south and west out US 60 West, including the Riverport), and the Central/Standard zone, which runs directly off the high service pumps and the Vine Street tank.

In order to rationally determine our needs in the North distribution system, we contracted with Strand Associates to construct and calibrate our Water Model in the Innovyze software we purchased in 2011. This effort was completed late in 2014, and with the model in our hands, we can more readily identify areas of concern and projects to address them. We plan to contract with Strand on an ongoing basis to assess discrete projects as they come up, with the following detailing some problem areas that need to be addressed.

1. North/Frontier Pressure Zone: The North/Frontier pressure zone booster station in Atkinson Park was built in 2008 after the near collapse of the Atkinson Park tank. This zone is adequately served by two storage tanks (Frontier & Green River). There are areas within the North zone that have inadequate pressure due to elevation of the land, mostly in Grantwood Hills, and on Timberline Drive. A study was performed, and Strand Associates has presented a report that identified options for these areas, including provision of a booster station at a point near the Green River Road tank, to provide a small additional pressure zone in this area. This would not provide adequate flow for fire protection but would boost pressure for individual residences at higher elevations. The chosen alternative from the Strand study envisions a new Green River Road pressure zone, controlled by a new Green River Road Booster Station, with two, 10-horsepower pumps controlled by VFDs, and approximately 850 feet of new water line. This project is shown to be constructed during 2023, at a cost of \$ 344,000.
2. South/College Pressure Zone: The South/College Zone was controlled by a small, outdated pump station near Fair Street, constructed around 1968. We have completed a project to move an unused temporary booster station on Barret Boulevard to a new location on 60 West, at the corner of Fairmont Cemetery. This new station moved the boundary of the South zone further out, and will improve pressure and flow to outlying areas. We anticipated this move might cause some problems with low pressure on the suction side of the station, and that has occurred. A project to alleviate those problems involved replacement of a very old cast iron main in the Hackberry area on S. Main Street, from Yeaman Avenue to Drury Lane. We will be making modifications to the old Fair Street booster station, so that it can remain as a backup to the new station.

The South pressure zone also suffers from having only one storage tank (College) available. This makes periodic cleaning or tank maintenance difficult. In 2002 we purchased a small parcel near the intersection of the KY 425 Bypass and US 41 A with the intention of constructing a 1.0 million gallon elevated tank, but a large increase in steel prices at that time led to a decision to shelve that project and it was never constructed. Cost of that size and type of tank at present would be approximately \$ 2.5 million. It is listed as a project on the attached schedules, but is put off to the end of the study period, as it is not necessary at this point, and would actually introduce operational difficulties in the system, until higher demand in that area allows better turnover in the proposed tank. Construction of that tank would also entail addition of a large diameter main along KY 425 to serve it and allow it to function in combination with the College Tank.

3. Central/Standard (or Low Pressure) Zone: The central pressure zone extends from the North and South zone boundaries and from Downtown to the edge of our service territory at Graham Hill. Overall, its problems of pressure or flow are the result of older lines, some of which exceed an age of 100 years. The water system plan includes an amount for line replacement each year, and will concentrate on areas adjacent to the Downtown, extending to the East End.

One area of concern was the North Main-North Elm-Craig Drive corridor, from 8th Street to 12th Street. Users in that area experienced rapid drops in pressure at times, and many homes were equipped with booster pumps on the customer side of the meter. We have completed a project to move this area to the North (Frontier) pressure zone, at a cost of approximately \$ 353,000. It led to improvements in both pressure and flow in that area.

An area near the Accuride plant, and some areas on Outer Second Street suffer from lower than optimal pressure. A possible solution to this issue would construct an additional booster station east of Hwy 41 and add a "Graham Hill" pressure zone that would encompass the far eastern areas along Zion Road, Hwy 41 South, and Adams Lane south of Airline Road. Wauford conducted a scoping study of that area to identify our options. Currently, the Graham Hill tank presents difficulties in operation when it is in service, and it had been sidelined for well over 2 years; it was brought online in June 2016 in preparation for the painting of the Vine Street Tank.

4. Distribution System Water Main Projects: Several main extension projects that would increase capacity and reliability in the system are included in the plan, but with limited cost estimating, pending modeling within the updated Water Model, and future detailed design.

Key projects in this portion of the plan are the 16" and 12" water main extensions associated with providing redundancy and better pressure and flow to the Borax Drive/Ohio Drive/Riverport area. In the Riverport off KY 136, we have had several lines that run toward the River and dead-end. These projects are designed to "cross the T's" of those lines, providing a looped system, and insuring redundant service. It is also hoped that these lines will make portions of the Riverport's industrial property more marketable to large customers. We have completed a portion of the 12" main extension to serve new development at Custom Resins.

Another important project in the Central zone entails installing a 20" continuation of our "backbone" system on S. Main Street from Hancock Street to a point past the Chapelwood Place apartments. This will tie-in to an 18" main that extends further out U.S. 60 West. Design is complete, with construction set for 2022.

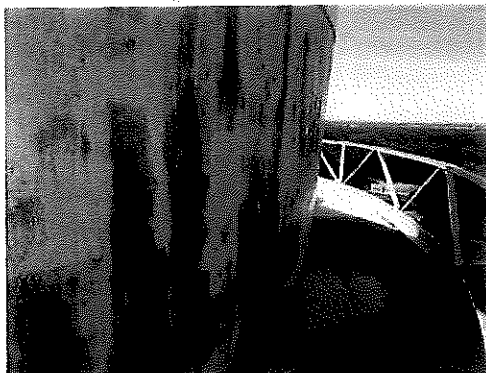
We have also included a 20" main from Washington Street and South Green, running down Washington and then to the "back side" of the Vine Street Tank. This will allow us an alternate means of filling the Vine Street tank. The design of this project was in our next batch of items to be solicited in an RFP, which was issued in late 2018. Construction is currently planned for 2024.

D. WATER STORAGE TANKS

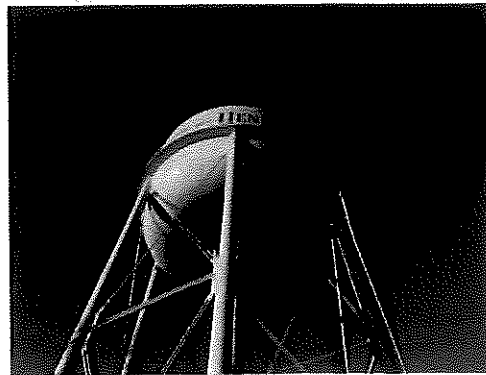
We completed an assessment of the nine storage tanks in the water distribution system in May 2014. Inspection reports summarized the work needed at each tank, and the repair and coating items have been categorized by immediate needs and those that can be put off for a few years. Sheet 1 of the Appendix shows a proposed schedule of repairs to the tanks for the Years 2019 through 2029 using costs generated by the inspection reporting.

Replacement of any one of these tanks is not an option; a new, elevated, 1-million-gallon tank would cost approximately \$ 2.5-3.0 million, or approximately \$ 2.50 to 3.00 per gallon, depending on style and height of the tank. The longer coating projects are put off, the more likely the need for extensive (and expensive) repairs.

- i. Frontier: This 500,000 gallon steel elevated tank was constructed in 1967-68, and was last cleaned and top-coated in 1992. There was significant paint failure and corrosion outside, and some corrosion and metal loss on the interior. This project was bid in May 2015, and coating was completed during the spring of 2016. Recoating of a portion of the bowl was completed in 2018 as a warranty repair.

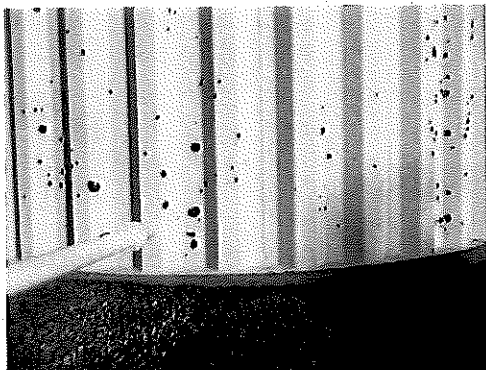


Corrosion on the Frontier Tank



Completed Project

- ii. Vine Street: This fluted pedestal steel tank has a capacity of 1,000,000 gallons. It was constructed in 1989 and was washed and top-coated in 1996. The exterior had 5 to 10% paint failure, and the wet interior surfaces showed significant corrosion. Bids were taken on this project in March 2016, and work was completed in April 2017, at a cost of \$ 846,297.

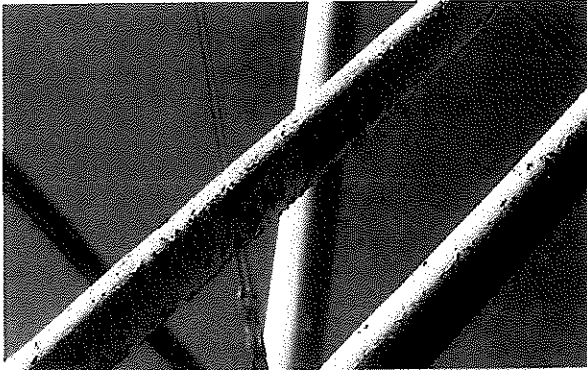


Corrosion on Tank Exterior – Vine Street Tank

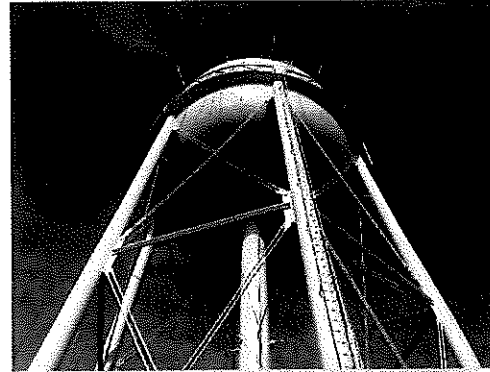


Completed Project

- iii. College: This 500,000-gallon steel elevated tank was constructed in 1967-68 and was cleaned and top-coated in 1992. Bids were received in April 2017, and we finished this project in the 2017-2018 fiscal year at a cost of \$ 435,252. Our consultant on this project, Strand Associates, assessed raising the tank by 15 feet to enhance pressure around the Riverport and the US 60 West industrial areas. Raising the tank would be required if the 41A/425 tank is built, but since that project may be delayed several years, the College Tank was painted and may be raised later.



Corrosion on Diagonal Bracing - College Tank



Project in Progress – Now Complete

- iv. Green River Road: This tank is a steel, modified standpipe with a capacity of 330,000 gallons. It was constructed in 1991 and has had no major maintenance. The exterior is in fair condition, and will likely require painting within the next 5 years. The interior wet and dry surfaces show some corrosion and pitting, and both should be painted within 1 to 3 years. We have it on the accompanying list in FY 2020. This tank is our most problematic for disinfection by-products, and will plan to modify internal plumbing to allow it to fill from the top and empty from the bottom, which will act as a rudimentary mixing system.



Loss of Coating on the Roof of the Green River Road Tank

- v. 4-Star: This is an elevated steel tank with a capacity of 1,000,000 gallons. It was constructed in 2004 and has had no major maintenance. The exterior is in fair condition, with 1 to 2 % paint failure; the interior wet surfaces are in poor condition with 10 to 15% paint failure. Our current

plan is to begin design of painting and repair of this tank in 2019, with a projected bid date of spring 2021.

- vi. Chamberlain: This 1,000,000-gallon steel ground storage tank was constructed in 2008 and as our newest tank has not required major maintenance. The exterior and interior surfaces are in good condition, and will likely not require painting within the next 5 years. Minor repair items are set for 2026.
- vii. Graham Hill: This 750,000-gallon steel ground storage tank was constructed in 1989 and has had no major maintenance. There is minor paint failure and corrosion outside, and some corrosion and metal loss on the interior. The interior should be repainted now, the exterior within 4 years. This tank is of limited usefulness in our system currently, and may be removed from service; at one point, it was a critical link in our connection to the Henderson County Water District, but that is no longer the case. However, this tank does act as the backup for Vine Street. It is scheduled for rehab in 2022 on the current list; a decision on keeping it in service should be made prior to any work being performed, along with consideration of the Graham Hill pressure zone project previously discussed.
- viii. Tyson: This is a fluted pedestal steel tank with a capacity of 1,000,000 gallons. It was constructed in 1996 and has not had any major maintenance. The exterior is in good condition, and will likely require top-coating within the next 5 years. The wet and dry interior surfaces are in fair condition and will likely be painted in 2024.
- ix. Atkinson Park: This is a 4,500,000-gallon steel ground storage tank constructed in 1945 and last painted inside and out in 2008 when the booster station associated with this tank failed. Interior and exterior are in good condition, and will likely not require painting within the next 5 years. This tank had heavy interior pitting of the steel when it was painted in 2008, and the repairs have held up well. Minor repairs are shown along with recoating/touch-up painting in 2028.
- x. Future Maintenance: This year, we again include an amount in future "out years" for further maintenance on all the tanks, starting with Frontier, so that we have a placeholder amount for future intensive maintenance, and don't build up another deficit in the tank maintenance category. Tank maintenance must be an ongoing, planned expenditure.

III. WASTEWATER SYSTEM PROJECTS

A. North Wastewater Treatment Plant:

The North Wastewater Treatment Plant Improvements (Headworks) project was substantially completed in CY 2016. This project increased the peak plant capacity to 25.5 MGD, which maximizes the through-put of the existing aeration basins.

We have identified additional work in the old clarifiers, and in the original digester building that needs to be done within the short term. The clarifier work was bid in the spring of 2017 and was completed in Q3 2018. Rehabilitation of these clarifiers will allow the completed plant to operate at its new design capacity.

Waste sludge pumps and some electrical work in a Digester Building project has been designed and permitted with the State, can be bid at any time, and is shown in the accompanying schedules as being built in 2025.

The belt presses at the NWWTP will need to be replaced or refurbished during the study period, and the plan shows those spread out over several years, with amounts that are really placeholders. We completed a study of our sludge disposal options in 2013, and can readdress the question of the best method of sludge disposal at that time, by updating project costs for the various options and re-running the cost-benefit analysis. The presses at the North plant are nearing the end of their useful life, but we had a successful project to rebuild similar presses at the South WWTP in 2019.

We have also included a project in FY 2023 to upgrade NWWTP Basin # 2 in the same manner that Basin # 1 was upgraded in 2013, with fine bubble diffusers mounted to a concrete floor and a more robust liner with a gas removal system. Renovation of Basin # 2 may allow Basin # 3 to be taken off line and used as a surge basin, greatly reducing the amount of air required for aeration and mixing and leading to large savings in electric use. Timing of this project will depend on the uncertain life of the existing liners in Basins 2 and 3.

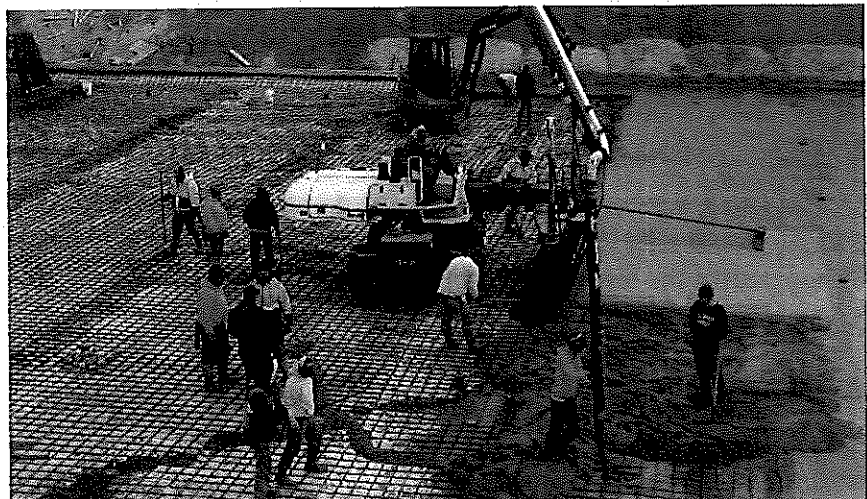
A project to add the second grit removal train to the Headworks, left out of the LTCP project but accommodated in the Headworks structure, is scheduled for 2028. This is not a high priority.

All these Wastewater System projects are shown on Sheet 3 of the Appendix.

B. South Wastewater Treatment Plant:

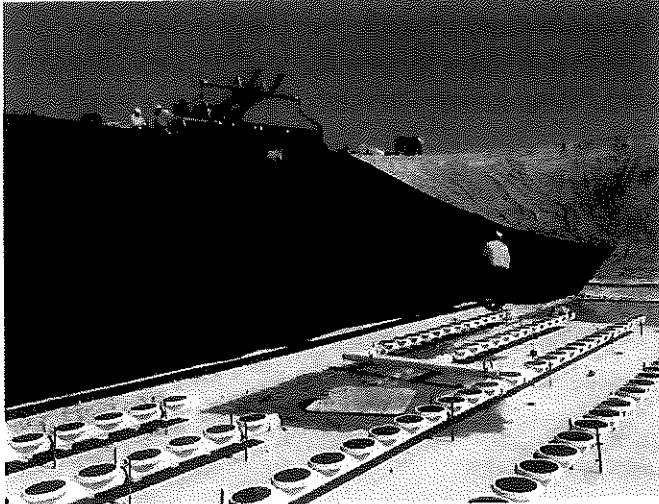
South WWTP projects are related to maintenance and not capacity, as the flow capacity of the SWWTP is rated at 8 mgd (except for the wastewater discharge line), and 8 mgd is twice the current capacity of the South water plant. Until a large industrial customer locates in the 4-Star area, no increase in SWWTP capacity is anticipated. A relocation of the wastewater discharge line has been included in the Raw Water line project for the South water plant, in order to remove this line from a bad location on the Big Rivers power station property. This is called "Project No. 1" under the South WTP Renovation projects listed above.

A major project of note at the SWWTP is the renovation of Basins # 4, 5 & 6, which experienced repeated liner and air diffuser trouble. Rehabbing these basins will increase the redundancy of the plant, and Wauford presented us a study to determine the best method of repair. Work began in late



summer of 2017, and one basin was renovated and on-line by the end of November. The remaining two basins were completed in early 2019, with a total project cost of nearly \$ 3.5 million.

A new portion of this project was added due to receipt of a grant from the Delta Regional Authority, which allowed us to include construction of some needed items that were left out of the basins project because of funding issues and the rush to get this project designed and bid.



This was to include several pieces of automation, as well as rehabilitation of the belt filter presses. After receipt of bids, which came in higher than expected, we scaled this project back to only include renovation of the belt presses, since they are the most critical element in that project. That press renovation project is also now complete.

The increased automation will be installed piecemeal over the next few years.

New Basin Liner being Installed – SWWTP

C. Wastewater Collection Systems:

Our goals for the Collection System are to continue with separation projects as we are able, to upgrade systems before they fail, and to insure compliance with EPA policy by reducing sewer overflows, either from the combined system, or from the separate system where capacity or maintenance might be an issue. Projects have been included in the plan for the following in the North Collection System:

- i. **Atkinson Park and Myrene Drive pump stations:** Study has been completed on options for these stations. The Myrene Drive pump station improvements are currently under design, and are a priority due to overflow and backup experience in that area. Atkinson Park pump station is also a concern due to its age, condition and location. Many areas that once contributed flow to this station (Balmoral, Frontier, and other areas on US 60 East) have now been redirected to the Canoe Creek Interceptor, so assessment of this station has led to a plan for replacing it with a smaller station with submersible pumps in the same vicinity. The master planning effort that was recently completed for this area also addressed the possible elimination of the Spruce Drive pump station, along with a new master pump station in the far north end of the service area. That master pump station project is beyond our means, at present. The resulting five Atkinson/Myrene projects are shown in the Wastewater schedule attached as being phased from 2020 to 2022. Myrene pump station was bid in February 2019 and is underway.
- ii. **Countryview Subdivision Sewer Lining:** This project would reduce problems with inflow and infiltration (I & I) in this old system of clay pipes with offset joints and sundry leaks. This area

and Highlander Acres are two prime sources of I & I, which cause us to pump and treat water that we shouldn't have to. Controlling I & I reduces costs to treat, and increases capacity in the system. This work is shown in the out years.

- iii. Highlander Acres Sewer Lining: Like Countryview, older portions of this subdivision have clay-tile sewers that leak and are a maintenance concern. This estimated amount is subject to detailed design, which has not been begun.
- iv. Highlander Acres Pump Station: Highlander Acres is a Cantex station, and these stations are maintenance headaches. Our long-term strategy is to replace these outmoded facilities, which are near the end of their useful life. The amount shown are placeholders, as detailed design has not begun.
- v. Audubon – Airline Sewer Project: When the Bent Creek subdivision was constructed on Airline Road, we extended sewer to that area, but left a small pump station near Presidential Park in service. Additional flow and potential projects in that area mean that this pump station should be retired, and we have a project in the planning stages to bore a gravity sewer under the Audubon Parkway, connecting to an existing sewer on Airline Road near the School System's maintenance building. This project has a cost estimate of \$ 280,000.
- vi. New Sand Lane Pump Station and International Paper Pump Station Upgrade: The IP station is set for a major overhaul in 2023, which may include additional wet well volume to allow the pumps to cycle less frequently.

Building a new station near the corner of Sand Land and South Alves Street will allow two other pump stations (Rolling Hills and Fair Street) to be consolidated into one, and that new station would discharge to the North Fork Pump Station force main, discharging directly to the North WWTP. This project would redirect an area of the separate sewer system away from the Ragan Street CSO overflow, possibly reducing sewer discharges to the Ohio River, and at the least will remove an area of separated flow that passes through the combined system on the way to the treatment plant. An RFP for these projects was issued in late 2018, and consultants have been chosen.

- vii. Separation Projects: We have done very preliminary planning for four additional separation projects, one in the East End, a smaller project in the Dixon-Green-Powell-Water Street sewer-shed, one in the Washington-Ingram area, and a large one related to the Ragan Street overflow. The East End and Washington projects would relieve stormwater flows to the North Fork pump station, reducing sewer overflows even further than our current efforts. The Ragan Street area is larger, and contributes to our most active combined sewer overflow. These estimates are placeholders, subject to further study and design.

These projects could reduce combined sewer overflows, but that need will have to be weighed against other priorities; since the completion of our LTCP and the pending issuance of a new permit for the North wastewater system that allows CSO discharges to continue, there is a reduced emphasis in our planning on reduction of the combined sewer system.

- viii. Sewer Inspection: We entered a services contract with a firm that specializes in sewer cleaning and inspection in October 2017, to provide those services for the Canoe Creek Interceptor Phase I system, which had been constructed about 10 years ago. Inspection of large diameter

sewers is beyond the capabilities of the TV inspection equipment we own. This contractor performed the inspection on over 41,000 feet of sewer line in about 6 weeks. We let another contract in late 2018 to continue this work by inspecting the Ragan Street and Downtown Interceptor systems. Future work will concentrate on the brick sewer that drains from the Midtown area to the Third Street Basin.

- ix. South Collection System: The South collection system is essentially a series of transmission mains from customers in 4-Star industrial park, the Tyson facilities, and the City of Sebree. Since most of this system was newly constructed in 1995, it is not anticipated that large-scale repair or replacement will be necessary during the study period. The 4-Star park authority completed a small project in 2016 to provide service to a "build-ready" lot in the park. Small projects to serve additional areas of 4-Star will likely happen as industrial development proceeds, but it makes little sense to construct wastewater collection lines to unoccupied lots in the industrial park.

IV. STORMWATER PROJECTS

We have included an annual amount from 2020 to 2022 of \$ 100,000 for continued stormwater work in Countryview Subdivision, which is being matched by the City.

We've also included amounts for several small stormwater projects and are advancing plans for those, which we will construct as funds become available.

The final phase of the Center & Julia project is shown being constructed in FY 2026, but that timing is subject to change. We recently revived that project, applied for and received a crossing permit. This project would be moved up in case of the emergency collapse of the existing stone culvert that this stormwater line is meant to replace.

The small amounts we have included for "Neighborhood Stormwater" projects are placeholders, and do not represent our total efforts in this area. Most stormwater work is performed as maintenance, and is not included here as capital spending. As larger stormwater projects are programmed, they will be taken from the amount allocated under the annual capital budget.

V. OTHER AREAS: VEHICLES, AUTOMATION, IT, ADMINISTRATION

We have included entries for each of these areas in the strategic plan, in an attempt to insure that these areas are not forgotten. Prior to 2010, we had a vehicle replacement schedule in place, but that was abandoned when funds got tight during the LTCP projects. We will now be playing catch-up on that schedule. A new wash truck was acquired in the 2015-2016 FY. A new "Vac" truck was acquired in FY 2018-19. These two vehicles are the most expensive and most used items in our fleet.

The Cityworks asset management software permeates our operations, and is the way we plan, schedule and track work for our field crews. It also is the method we use to allocate costs to some contractual customers. We are committing to using this system as a predictive and preventive maintenance program for the treatment plants. Cityworks is able to support handheld computers, so that our GIS mapping and system information are more readily accessible to everyone in the field.

Another need we hope to address is the lack of a useful model of our wastewater system. The Innovyze software we purchased for our water model has the capability of producing such a model, and we will likely pursue having a consultant develop that at some point. The water model has proved to be invaluable in planning distribution system projects.

Placeholder entries for IT, SCADA, vehicles and small equipment are shown on the final page of the Appendix in the "Overall Summary".

VI. CAPITAL IMPROVEMENT PLAN SUMMARY

The last sheet of the Appendices shows an overall summary of the expenditures required by this CIP. Please note that several projects listed in the plan have no dollars associated with them, as yet. Also, the summary includes an inflation adjustment, assuming construction industry inflation of 2% in the years ahead.

The needed plan expenditures ramp up in the out years of the plan, and there may be a need for additional bonding in that period to complete several major projects.

Our task in the years to come will be to mold this plan to fit available resources as conditions change, as they always do, and to keep in the forefront that clean water is our reason for being here.



VII. POLICIES AND PERFORMANCE STANDARDS RELATED TO STRATEGIC AND CAPITAL PLANNING

The *American Waterworks Association (AWWA)* publishes standards for our industry, including Standard G-410-09, *Business Practices for Operation and Management*, which describes the critical elements of effective business practices for the operation and management of water and wastewater utilities. Effective business practices establish criteria for how water utilities develop, measure the performance of, and improve the strategic planning, resource management and support functions necessary to create and sustain a high-performing organization. The following is a listing and discussion of these standards and how they are met by our staff.

- A. **Strategic Planning:** To meet this standard, we must have policies related to developing and implementing a Strategic Plan. In practice, this means that a plan is in place to: guide the delivery of our core services; maintain and invest in infrastructure; and hire and develop employees.

We update our strategic plan yearly. The implementation of this plan is one factor used in performance evaluation of senior management. Additionally, the needed investment identified by the capital improvement planning process is used to formulate the Utility's financial planning and long-range forecast of expenditures and cash flow, and to inform decisions on rate adjustments. The Strategic Plan then serves as the basis for communicating the expectation for management to implement necessary programs and projects to accomplish the mission of HWU, and deliver our core service, which is clean water, from river to river.

- B. **Capital Improvement Program:** To ensure acceptable performance of our infrastructure over the long run, we must have in place policies for developing a multi-year capital improvement program that specifies in detail our plans for replacing, rehabilitating and expanding our system infrastructure. This includes policies related to employment of consultants; project selection; and financing and facilitating system growth.

Key to this standard is accountability for program execution. In our case, the responsibility lies with the senior management team of the General Manager, the CFO, and the Director of Operations. In general, this team oversees all aspects of the CIP, including project selection, development, financing and scheduling. They are assisted by engineering and operations staff.

We utilize consultants on most projects, save for small line extensions and internal repair/overhaul projects. This allows internal staff to focus on planning and day-to-day execution. Project selection is driven by the availability of funds – at present, we have more project needs than available capital to fund them.

In terms of financing future system growth, we largely rely on outside funding. Sources of outside funds include developer-built infrastructure related to new subdivisions, commercial facilities or new industry. HWU has policies in place that allow outside developers to recoup some costs of new facilities, in cases where other lands can be served by those facilities at some point in the future. We also have utilized grant funds for system expansion (Coal Severance for the Finley Addition Sewer Project, Delta Regional Authority for the Automation/Rehab project at the South WWTP) and for the Custom Resins/Riverport Water Main, and we are actively pursuing other grant opportunities.

Within the City limits, our system is largely “built out”, and there are few areas that require costly line extensions. Growth in the Henderson area has slowed, and our CIP does not include funding to extend service to undeveloped areas not currently served.

The recent selection of a preferred route for Interstate 69 through Henderson may lead to design and construction of some extensive water and wastewater relocations. The I-69 preferred corridor crosses U.S. 60 East at the same location as our major trunk sewer that served that area. Moving the sewer from under the proposed roadway will be a major undertaking.

An area that needs improvement is in community and stakeholder communication. We do not have an ongoing communications program for relaying our capital improvement program to the community, regulators and other external stakeholders. We do a decent job of communicating to internal stakeholders (employees and Board members), and through social media, but our business is not exciting or especially fascinating to a general audience, and it’s difficult to generate much interest on Facebook or Twitter.

Technology is used to inform our CIP decision making. Extensive SCADA monitoring and associated data-mining software keep us aware of problem areas in our system. Daily reports of pump station run times and CSO overflow volumes are disseminated to management, and help to point up problems that need to be addressed in the CIP. Our Geographic Information System (GIS) is also a vital tool in analysis of our collection and distribution systems. We purchased modelling software that works inside the GIS, and have used that to propagate a model for the water distribution system. A model of the wastewater collection system is needed, and will be pursued in the next few years.

- C. **Continuous Improvement:** On the Water side, we participate in the Partnership for Safe Water, whose mission is to improve the quality of water delivered to customers by optimizing water system operations. The Partnership offers self-assessment and optimization programs so that operators, managers and administrators have the tools to improve performance above and beyond even proposed regulatory levels. In this program, we are teamed with six drinking water organizations and more than 200 water utilities.

So far, this program has involved the two water treatment plants, and we are working towards implementing the companion Distribution System program.

The goal of the Partnership is to provide a new measure of safety to our customers by implementing prevention programs where legislation or regulation does not exist, or that go above and beyond the basic limits of existing regulations. Preventative measures are based around optimizing treatment plant performance and distribution system operation, and the result is the production and delivery of superior quality water to all users.

- D. **Engineering:** To meet standards in this area, we have policies in place to balance the use of in-house staff and consultants to implement projects. This includes our policy of issuing requests for qualifications (RFQs) for most large capital ventures.

We also have in place Technical Standards for each major area of work, Water, Wastewater and Stormwater, which guide the selection of materials, equipment, construction methods, safety, and environmentally responsible maintenance and construction practices.

Likewise, we have policies in place for ensuring the quality of work performed by contractors and private parties. These include a position of Construction Inspector in our staffing, and the employment of resident project representatives on large construction projects. We also have a policy of obtaining and retaining accurate as-built information upon project completion, as well as GPS positioning information on in-ground facilities as they are constructed. The system for electronic filing of as-built plan information is incomplete and cumbersome, and is an area that needs improvement.

One area of concern in the Engineering field is our inability to hire replacement engineering talent, as our engineering staff ages-out and retires in the coming years. An attempt to hire a Director of Engineering in 2015 fizzled due to a lack of qualified outside candidates.

- E. **Finance and Fiscal Management:** This area covers financial planning, budgeting, accounting, reporting, debt management, management of reserves, and rate making.

Our financial planning and reporting functions are strong and robust. The annual budget preparation process has been automated using extensive and interlinked spreadsheets. Ongoing expenses and requests for new funds are entered by line managers, and then reviewed at the Department Head level, prior to being submitted to our Board for approval and forwarding to the City Commission for their endorsement.

The budgeting process includes discussions with our Board on debt management, maintenance of sufficient cash reserves, and rates. This takes the form of a multi-year cash flow forecast that is regularly updated and presented to the Board.

Debt management is addressed in our annual audit, which provides a good summary of outstanding debt and the obligation of the Utility to reimburse the City for all required debt service payments, through the end of the current bonded indebtedness. All of our current bonds were issued as Tax-Exempt, General Obligation bonds by the City. There are provisions in the enabling ordinances for each bond issue that require HWU to commit funds to the City to retire this debt.

Monthly reports to our Board, along with an annual audit, insure that our financial condition is transparent and above-board. The monthly financial reports compare current period results with previous period results, as well as budgeted results. Unusual or one-time revenue and expense items are flagged and explained.

Finance includes the process of receiving, categorizing and paying bills, and of generating invoices for receivables. This process is tightly integrated with the City's financial software, which has recently been upgraded. The upgrades have included better reporting, streamlined payment procedures and a general reduction in the manhours devoted to financial duties. Additionally, it has allowed us to reclaim some payment/billing functions, in-house, so we have more control.

In the area of rate making, we have some control, but ultimate responsibility lies with the elected City Commission. Our relationship with the City is good, but timing of rate adjustments can be impacted by political considerations.

In addition to rate reviews, we also regularly review fees and surcharges, comparing our current charges to actual costs over 2 to 3-year periods. These fees include charges to industry related

to pretreatment, and charges for taps and connections to our system by developers and land owners.

- F. **Governance**: This area deals with enabling legislation, and operating policies of the Board. Our enabling legislation is contained in the City Code of Ordinances, which sets up our Board, describes the duties of our General Manager, and sets forth the basic structure of the relationship between HWU and the City of Henderson. The General Manager is appointed by and serves at the pleasure of the Water and Sewer Commission (referred to as our "Board"). Senior management and the Board are governed by the local Code of Ethics.

We regularly review and enact changes to the City Code sections that govern our day to day functions, and act as the legal underpinning for enforcement action. This process began in earnest in 2011 with a complete update of the relevant chapter of the Code, which included extensive changes related to the Municipal Separate Storm Sewer System (MS4) sections, which had lagged and needed to be implemented immediately. As time has passed, other sections have been updated, clarified and added. Additionally, staff has been involved in updates to other sections of the Code, including those related to erosion and sediment control on construction sites, flood damage prevention, and trenchless construction.

We have recently completed a review of our Local Limits, and are ushering that through the City approval process, along with the addition of a surcharge based on chemical oxygen demand (COD) on the wastewater side.

In October 2013, we initiated a complete review of the organization's internal policies and procedures, and began a process of codifying and disseminating those throughout the utility in the form of a Policy Manual. That process is largely complete, and has resulted in the issuance of over 30 policy documents covering everything from water & sewer taps to information security, and boot & clothing allowances.

In December 2014, we adopted a policy that specifies procedures for obtaining Board approval of projects and expenditures through Board Action Reports and Board Resolutions. Action Reports are not required for budgeted capital expenditures in amounts less than \$ 20,000 but are required for all other capital projects and for budgeted capital items under \$ 20,000 when special or unusual circumstances apply (sole source, bid irregularities, etc). Action Reports are prepared from pricing obtained under the requirements of the Purchasing Policy, contained in policy B-200.

Board Resolutions are typically required for items that will be forwarded to the City for further action, such as dispositions of real property, ordinance revisions, or budget amendments, and for hiring and setting the compensation of non-civil service positions. Resolutions require a roll-call vote of the Board.

- G. **Health and Safety**: We have in place policies and performance standards for managing employee health and safety. These include policies related to management and mitigation of hazards, extensive training requirements, and metrics that enable us to measure the effectiveness of our health and safety policies. We employ a dedicated Safety and Training Coordinator who deals directly with our workers and management.

Annual trainings are provided in confined space entry, lockout/tagout, trenching and shoring, fall protection, blood-borne pathogens, flagging and traffic control, equipment operations, hearing protection, use of personal protective equipment and chemical safety.

In addition to creating a “safety culture”, our top management is responsible for developing, modifying and evaluating the effectiveness of our employee health and safety strategy. Frontline workers, however, have the primary responsibility for executing a health and safety program, and have the most valuable insights into health and safety risks they face and the opportunities for improvement.

Some safety functions (workers compensation, etc.) are handled by City personnel attached to the Human Resources department. We also participate in the City’s Safety Review Board, a committee made up of management and frontline employees from the entire City workforce.

Our dedicated Safety and Training person has been to several “train the trainer” classes, and can provide training to our staff in several areas that do not require us to hire expensive outside talent.

- H. **Human Resources:** We have in place policies related to classification and compensation, hiring and selection, provision of training, performance reviews, corrective action and discipline, Provision of benefits (health care, vacation and sick leave), and compliance with federal and state law. Many of these areas are controlled by State statute for the Civil Service system.

We completed a compensation study in 2017 that compared our salary levels to other cities of our size in Kentucky, and this study informed a large number of salary adjustments in the 2018 fiscal year.

We have adopted an unwritten policy of hiring new Department Heads and some professional staff as non-Civil Service employees. This mirrors City policy, and allows more leeway in hiring, compensation and severance of employment. Currently, the General Manager, Chief Financial Officer, Director of Operations and Project Engineer are covered by contractual, non-Civil Service arrangements.

Related to the broad area of human resources, we have policies in place that encourage our employees to seek training and certification in areas related to their work duties, and that compensate them for achieving higher levels of licensure.

Most day-to-day HR functions are handled for us by the City’s HR Department.

Disciplinary actions follow the City’s Employee Manual, which contains procedures as required by the Civil Service statutes. In due course, disciplinary actions are reviewed by a Civil Service Commission, a three-member City board that has ultimate authority.

- I. **Information Management:** We employ a dedicated Information Systems Manager, who, in conjunction with the City’s IT department, oversees our computer systems and the integration of some functions with the City’s payroll, financial and billing systems. HWU also has an Automation department with two specialists who direct implementation of our Supervisory Control and Data Acquisition (SCADA) system. Finally, we employ a dedicated Geographic Information System (GIS) Manager, who oversees the extensive and ever-growing mapping and

work order systems that we use to schedule work and record the location and condition of our physical assets.

We have policies in place to guard sensitive information. Since personal information may conceivably be contained in any email, those with email access on personal cell phones are required to allow us to wipe that phone if it is ever lost (we have not done this, to date). Since we do not handle most HR-related records (that is done by the City), we have access to few items of personal information. Training has been done on personal privacy compliance for those who have access to birthdate, SSN, or other sensitive personal data.

Our security management for IT infrastructure is robust. Multiple firewalls exist, and the SCADA system is explicitly designed to be non-accessible from the internet.

Work order management is a very important facet of our operations; we manage this information with the Cityworks software purchased in 2014. It is an integral part of our procedures, impacting most of our operations. It also is used to allocate costs to various functions, so it is important from a financial perspective, also.

We are implementing a move to Sharepoint, to better control and access project files and other historical information.

- J. **Organizational Development:** Specific policies contain standards to ensure ethical business practices, and transparency of business transactions. Multiple levels of approval are required prior to any disbursement of funds.

Closely related to development of the organization is the need for succession planning. Our inclusion in a Civil Service system makes this nearly impossible at the street level, since promotion and filling of vacant positions are governed by arcane rules of testing and onboarding. To the maximum extent possible, we attempt to fill open positions with internal testing, which includes HWU and all other City departments. Since upper management and professional positions have been made non-Civil Service by City policy, we are now able to fill those openings without following the Civil Service rules and mandates.

In order to foster employee involvement and teamwork, management holds regular meetings with groups of employees in various workforce areas (operators, crew leaders, senior staff, etc.).

Knowledge retention and management is a key issue for us, as we have reached a period where a large number of our senior employees are eligible for retirement. The requirements of the Civil Service system for promotion and hiring make it difficult to train an existing employee to fill a soon-to-be-vacant position. Keeping top management positions outside Civil Service is a plus in this regard.

- K. **Plant and Property Management:** We do not have detailed written policies in place for management of records, deeds, drawings and other documents. This is a critical need.

Our maintenance practices do not include regular inspections of equipment, roofs, doors, windows, gutters, and foundations. Maintenance of physical plant is performed on an as-needed basis.

Lawn, fence and security maintenance is performed by outside contractors. We bid an extensive facility mowing contract that covers over 75 locations throughout the City and County. Compliance with contract terms is monitored by the operational personnel in charge of maintenance for each facility.

Work orders are used to track work history for assets in our systems, and from a financial perspective, they are the records we use to allocate costs between our various plants and systems, impacting billings for some of our large contractual customers (i.e., Tyson billing reflect costs for the South Plants, etc.). Work order management is thus a very important facet of our operations; this is done in the Cityworks software purchased in 2014. Implementation and adjustment of this system has been ongoing since that time.

Systems for tracking preventive/predictive maintenance are covered in spreadsheets and personal calendar reminders. The Cityworks system does not easily address work orders that must be generated on a daily/weekly/monthly/quarterly basis.

Vehicle maintenance is largely performed in-house by our own mechanic. He schedules regular and preventive maintenance on our fleet, with some larger projects being contracted out to various local businesses. Vehicle replacements have been scheduled from a master list in the past, but with the reduced capital funding we have available, we now replace vehicles only at the end of life, either through attrition or after a wreck.

Training of maintenance staff has been enhanced with classes offered through the Henderson Community College. These have included basic and advanced electrical knowledge, which has allowed several of our maintenance technicians to advance in grade and classification.

Easement procurement policies and procedures are well documented in policy.

Our capital improvement plan includes projects that address the redundancy and adequacy of facilities, in our plants and in the distribution and collection systems.

For services and functions not available internally (welding, electrical, etc.), we contract on an as needed basis. This reduces our staffing levels and costs associated with "beefing up" our staff to cover every contingency and situation.

- L. **Procurement:** We promulgated an HWU-specific Purchasing Policy in August 2014, updating it twice since then. This policy governs requisitions, authorizations, approvals, and purchase limits. It also reinforces the fiscal responsibility and accountability delegated to department heads, managers and employees, and attempts to expedite purchases and payments, purchasing and payment procedures by clarifying the delegation of purchasing authority.

By Ordinance, HWU follows the Model Procurement Code established by Kentucky law (KRS 45A.345 to 45A.460), and that is codified in the City Code at Chapter 23, Section 45.2 (adopted in September 2017). Our procurement policy contains specific requirements for levels of purchasing limits, ranging from sealed bids (greater than or equal to \$ 20,000), detailed quotes (\$ 2,500 to \$ 20,00), verbal or telephone quotes (\$1,000 to \$ 2,500), or "best effort and judgment" (\$ 50 to \$ 1,000). Purchase under \$ 50 are made from vouchers or petty cash. Travel and training expenditures always require a voucher, and approval by the Department Head and GM.

Specific positions have spending limits set for their approval authority, classified by upper management, middle management, Crew Leader/Specialist/Operator, and line-level employees.

We follow the Model Code provisions for notice (public bids), criteria for evaluation and award, and guidelines for waivers and declaration of emergencies. The policy also includes provision for quicker, streamlined approval of items that are procured under a specific contract (construction projects, chemicals, sludge disposal, etc.) or that are regular monthly bills (telephone, power, etc.).

Additionally, we have adopted a policy for disposal of surplus personal property, which ensures that assets to be disposed of are made available to the public on an equitable basis, to realize the maximum return on investment on disposal, and to ensure that assets are removed timely and accurately from the Utility's accounting and inventory records. The guiding principle in disposing of assets is to maximize the return on the investment, and this means that the method used is usually a public auction, or the web-based auction site [GovDeals](#).

Under the policy, surplus property will not be given to an officer or employee of HWU or the City. HWU employees involved in the decision to declare any item of property as surplus are not allowed to directly or indirectly bid on any item for sale.

The Disposal policy also includes requirements for proper disposal of electronically stored data to ensure the privacy and security of sensitive user information, such as personnel records, financial data, and protected health information. Any equipment which has capabilities of storing such data must be sanitized via removal of the data storage mechanism (hard drive, memory cards, flash drives, tapes, cartridges, etc.). It is the responsibility of the IS Manager to properly destroy data storage mechanisms before disposal of property.

Disposal of real property is covered by specific sections of KRS.

M. Risk Management: Here is a brief summary of some risks faced by the Utility.

Fluctuating Demand: We face risks of not being able to meet the needs of a large new water customer in the South system, but have drawn up plans for a plant replacement/expansion that will address that issue. Some additional demand could be met in the North system, but a large-use customer would stretch our water plant during the summer months. We currently have no plans to expand the North Water plant, where higher demand would require additional filter capacity.

On the down side of the demand picture, water use has fallen from both residential and industrial customers. Residential use decline is likely due to increased use of low-flow fixtures, and the elasticity of demand in response to our rates increasing by 5.85% per year from 2011 to 2018. For industrial users, lower use is directly related to attempts by large customers to contain costs. Further reductions in use may lead to a need to increase rates on all customers to maintain our current expenditures, as many of our costs are fixed. This Conservation Conundrum, as it's called, is being faced by utilities across the country, and the industry hasn't come up with a good fix to the problem.

A Few Large Customers: Two large industrial users and one governmental entity (Tyson Foods, International Paper, and the Henderson County Water District) account for a large amount of

our yearly revenue. For fiscal year 2017, these three customers accounted for \$ 8,230,004 in sales and surcharges, or 43% of our total operating revenues. Closure of either of the large industrial customers would have an immediate, material adverse impact on our financial condition.

Environmental Regulation: We are subject to governmental regulation by federal and state authorities covering a variety of environmental, health, safety and labor laws and other matters. On the environmental side, the Kentucky Division of Water regulates us under permits for our water and wastewater plants, as well as a stormwater permit (MS4). Any failure on our part to comply with laws and regulations could have an immediate adverse impact on us, from possible fines for permit violations to imposition of consent judgements or administrative orders for more serious offenses. More seriously, government can at any time change the legislative and regulatory framework within which we operate, leaving us no recourse to address adverse impacts on our costs and expenses. On the health and safety side, we employ a Safety and Training coordinator working full time to keep us compliant with rules on training, and for job safety oversight.

Technology: We rely on information technology in all aspects of our business. As SCADA and IT systems have grown more complex, we are able to remotely monitor plants, tanks and pump stations, and this ability has greatly increased the reliability of our systems. Office IT improvements have made us more productive, too. The Cityworks asset management system is central to much of our workflow. The threat of a cyberattack or other significant disruption or failure of IT systems, software, or communications could mean a significant service disruption or security breach, which could have a material impact on operations. We have installed robust firewalls and anti-virus software, but the level, scale and sophistication of attacks grows every day.

Hazardous Materials: We store, manage and use a large volume of chemicals, some of which present a hazard if released to the atmosphere or combusted. Release or human contact with some of these chemicals could involve significant costs, claims for personal injury, property damage and environmental penalties and remediation in excess of our insurance coverage. Switching to ultraviolet disinfection at the North WWTP has greatly reduced one source of potential failure.

Personnel Retention/Replacement and Personnel Costs: We have many experienced employees who have passed or are approaching retirement age, with 16 retiring in the last 5 years, and approximately 20 more who may be eligible to retire in the next 5 years. This loss of some of our most knowledgeable employees will have an impact on our ability to perform work in a timely and efficient manner.

Costs for insurance, pensions, and other benefits are directly related to the number of employees, and only partially controllable. A strategy to deal with increased costs associated with salaries and benefits, especially pension costs, may lead us to hiring fewer employees, and contracting out more services.

Sewer Backups: Over the course of a year, we encounter 3 to 5 sewer backups into basements, on average. Damage is covered by insurance with a \$ 10,000 deductible. In most cases, we do

not have prior knowledge of the causes of these backups, and insurance rejects the claims. We have a policy in place to defray costs for the homeowner up to a limit of \$ 2,500.

Climate Change: There is mixed scientific and anecdotal evidence that algae blooms on our source rivers are increasing due to global warming. Treatment of algae in our raw water increases our costs for carbon. Significant blooms containing hazardous substances could overwhelm our treatment facilities, leading to substantial problems with delivery of water, including disease outbreaks.

Claims and Lawsuits: We currently do not face any lawsuits or claims of a significant nature, but we do have exposure to the potential for claims related to labor and employment, personal injury, catastrophic accident and environmental liability.

The Unknown Unknowns: Most of our water distribution and wastewater collection systems are underground and not normally visible. While we use cameras to inspect our collection system pipes and manholes, water pipes are inaccessible. We can't know the true condition of most of these assets, and rely on informed assumptions to make decisions.

Tank Coating and Repair Summary

<i>Water Storage Tank - Repair and Coating Project Summary</i>																			
Tank Project Summary					Estimated Repair Costs by Tank/FY														NOTES
Tank	Volume (Gallons)	Year Constructed	Type	Prior Major Maintenance (YR)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Atkinson Park	4,500,000	1946	Ground	2008										\$130,000				\$444,700	
Chamberlain	1,000,000	2008	Ground													\$67,000			
College	500,000	1967	Elevated	1992 (See Note 1)				\$392,287											\$50,000
Four Star	1,000,000	2004	Elevated								\$219,000				\$185,000				
Frontier	500,000	1967	Elevated	1992 (See Note 1)	\$14,000	\$491,667													\$50,000
Graham Hill	750,000	1989	Ground	Interior 1991								\$211,000		\$160,000					
Green River Road	330,000	1991	Wet-Riser Hydropillar	Exterior 1992						\$374,000									
Tyson	1,000,000	1996	Fluted Column Hydropillar											\$516,000			\$325,000		
Vine Street	1,000,000	1989	Fluted Column Hydropillar	1996			\$846,297												\$50,000
Total Spending Per FY					\$ 14,000	\$ 491,667	\$ 846,297	\$ 392,287	\$ -	\$ 373,000	\$ 219,000	\$ 211,000	\$ -	\$ 806,000	\$ 185,000	\$ 67,000	\$ 325,000	\$ 444,700	\$ 150,000
					- Primary Coating/Repair Needs														
					- Secondary Coating/Repair Needs - (Deferred)														
Note 1: Interior 1991 / Exterior 1992					- Actual Expenditures														
					- Future Minor Maintenance														

Water System Projects

Water System											
Water Main/Distribution System Project Summary											
Project		Location	Total Estimated Cost	2015	2016	2017	2018	2019	2020	2021	2022
North WTP - Critical Elements - Flash Mix		North WTP	1,661,226	-	1,695,533						
North WTP - Non-Critical Elements - Building, HVAC		North WTP	1,195,000								1,195,000
South WTP Expansion - Project 1 - Raw Water Supply and Effluent Line Upgrades (Design 2015/ Build 2017)		South WTP	1,950,000	40,000				1,310,000			
South WTP Expansion - Project 2 - Immediate Repairs (Design 2015/ Build 2016)		South WTP	235,000	15,000	185,715						
South WTP Expansion - Project 3 - Prestressed Concrete Clearwell		South WTP	950,000				950,000				
South WTP Expansion - Project 4 - Capacity Upgrade/Membrane Filtration (Design Only)		South WTP	12,000,000	513,000		Not Funded /Design only					
South WTP Expansion - Project 5 - Dedicated Raw Water Pumps in BREC River Intake		South WTP	1,600,000					1,600,000			
South WTP - Backwash Pumping System		South WTP	375,000					375,000			
Cast Iron Water Main Replacement - Yearly		Water Distribution	Annual Project	70,520	95,910			100,000		100,000	100,000
U.S. 60 West Water Booster Station		Water Distribution	185,000		240,810						
Green River Road Water Booster Station		Water Distribution	344,000								344,000
Graham Hill Water Booster Station		Water Distribution	1,600,000								
South WTP Study - Project 6 - Seabee Pressure Zone Water Main		Water Distribution (South)	585,000								585,000
New 425/41A Water Tank		Water Distribution	2,500,000								1,250,000
Ohio Drive to Riverport - 12" Water Line (Riverport Loop Project) - Mosaic		Water Distribution	150,500	149,448							
Borax Drive to Ohio Drive - 16" Water Line (Riverport Loop Project)		Water Distribution	700,000						700,000		
Ohio Drive to Riverport - 12" Water Line (Riverport Loop Project) - Custom Resins		Water Distribution	315,000				315,000				
North Main Street Pressure Zone (Craig Drive - N. Elm)		Water Distribution	315,000		353,397						
Extend 20" Water Main - Hancock St. to McClain		Water Distribution	1,500,000						1,500,000		
Extend 20" Water Main - Washington To Vine		Water Distribution	1,500,000							1,500,000	
Extend 12" & 16" Water Main along KY 425 Bypass		Water Distribution	700,000								700,000
South Main Street Water Main - Hackberry		Water Distribution	235,000				235,000				
Total Spending Per FY			715,448	497,045	2,038,930	330,910	1,365,000	1,685,000	1,600,000	1,600,000	800,000
- Actual Expenditures											

Wastewater System Projects

Wastewater System			Estimated Costs per FY														
Wastewater Plant/Collection System Project Summary		Total Estimated Cost	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Project	Location												500,000			1,000,000	
Countryview Sewer Lining	Collection System	1,500,000							150,000	150,000		300,000					
East End Separation Projects	Collection System	600,000					54,000										54,000
Comanche Drive Sewer Replacement	Collection System	54,000															1,500,000
Ragan Street Separation Project	Collection System	1,500,000													350,000		
Highlander Sewer Lining	Collection System	350,000											500,000				
Dixon/Clay Separation Project	Collection System	500,000												550,000			
Washington/Ingram Sewer Separation	Collection System	550,000															
Riverdale Court Storm/Separation	Collection System	125,000						125,000									
Atkinson Park Sewershed - Project 1A - Myrene Dr PS Renovation - New Station	Pump Stations	702,121					702,121										
Atkinson Park Sewershed - Project 1B - Myrene Dr PS - New Force Main	Pump Stations	369,000						369,000									
Atkinson Park Sewershed - Project 2 - Atkinson Park PS Replacement	Pump Stations	561,000						561,000									
Atkinson Park Sewershed - Project 3 - Atkinson Park PS - New Force Main	Pump Stations	758,000							758,000								
Atkinson Park Sewershed - Project 4 - Eliminate Spruce Dr PS	Pump Stations	380,000								380,000							
Audubon - Airline Sewer Project	Pump Stations	280,000							280,000								
International Paper Pump Station Upgrade	Pump Stations	205,000									205,000						
Crestline Pump Station Upgrade	Pump Stations	50,000										50,000					
Highlander Acres Pump Station Upgrade	Pump Stations	150,000													150,000		
Bentley Hughes Pump Station Elimination	Pump Stations	200,000						200,000									
New Sand Lane Pump Station - Rolling Hills/Fair Street Replacement	Pump Stations	800,000								800,000							
NWWTP - Clarifier 1 & 2 Upgrades	North WWTP	781,472		781,472													650,000
Add Second Grit Removal Train - NWWTP Headworks	North WWTP	650,000									400,000						
Replace/Renovate Belt Presses (Sludge Disposal)	North WWTP	400,000															
Sludge Disposal Upgrades (ATAD System/Class A Sludge)	North WWTP	9,700,000	Not Funded										435,000				
Upgrade Sludge Digester Building (Piping, Pumps and Controls)	North WWTP	435,000									1,800,000						
Upgrade EAB # 2	North WWTP	1,800,000															
Renovate Belt Presses (Sludge Disposal) - net of DRA Grant	South WWTP	180,000					180,000										
Fine Bubble Aeration Renovation - Basins 4, 5 & 6 (10 MG Volume)	South WWTP	3,460,351			116,000	2,200,000	1,144,351										
Sludge Storage Building	South WWTP	150,000	166,625														
Total Spending Per FY			\$ 166,625	\$ 781,472	\$ 116,000	\$ 2,200,000	\$ 2,080,472	\$ 1,255,000	\$ 1,188,000	\$ 1,330,000	\$ 2,405,000	\$ 350,000	\$ 1,435,000	\$ 550,000	\$ 500,000	\$ 1,650,000	\$ 1,554,000
			- Actual Expenditures														

Stormwater System		Stormwater System Project Summary														
Project		Total Estimated Cost														
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Countyview Stormwater Project (50/50 with City)	\$ 200k Annually	\$ 100,000	\$ 100,000				\$ 100,000	\$ 100,000	\$ 100,000							
		\$ 25,000		\$ 25,000	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Neighborhood Stormwater Projects		\$ 25,000		\$ 25,000	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Van Wyck Road Box Culvert	\$130,000															
Chestnut - Norris Stormwater	\$220,000					\$ 220,000										
Atkinson - Clay Stormwater	\$300,000					\$ 300,000										
Judson Place Stormwater	\$350,000						\$ 350,000									
Center & Julia Phase III	\$1,800,000													\$ 1,800,000		
Hwy 41 Storm Sewer Lining	\$123,000									\$ 123,000						
Sugar Creek Bank Stabilization	\$50,000															
Total Actual Expenditures		\$ 125,000	\$ 132,468													\$ 150,000
Total Spending Per FY																\$ 150,000

Capital Improvement Plan Summary

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